THE EFFECT OF 21ST CENTURY ACCULTURATION MODULE ON THE STUDENTS' HIGHER ORDER THINKING SKILLS AND ACADEMIC ACHIEVEMENT

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A thesis submitted in
fulfillment of the requirement for the award of the
Doctor of Philosophy in Technical and Vocational Education

Faculty of Technical and Vocational Education
Universiti Tun Hussein Onn Malaysia

JANUARY 2020

Dedicated especially to my beloved husband and children

Mohd Syazwan Bin Che Manshor

Qayla Illiyyeen Binti Mohd Syazwan

Muhammad Qayl Syafeeq Bin Mohd Syazwan

for their support and patience during my study

To my Mom and Dad

Hj. Mohamad Mohsin Bin Hj. Salleh

Hajah Siti Manisah Binti Suriani

Thank you for your guidance and strength

To my brothers, sisters, and friends

Thank you for the words of advice and encouragement to finish the journey

ACKNOWLEDGEMENT

I would like to express my appreciation to my supervisor, Profesor Madya Dr. Razali Bin Hassan for the continuous support given throughout the duration for this research, for his patience, motivation and enthusiasm. Without his guidance and persistent help, this thesis would not have been possible.

I would like to express my sincere thanks to Dr. Ahmad Fadzil Bin Arif for his help related to this thesis work. I also would like to extend my sincere gratitude to all of the teachers involved in this research. I would like to give special thanks to teachers from Kolej Vokasional Seri Iskandar, SMK St. Bernadette's Convent, SMK Bandar Baru Bangi and SMK Seksyen 16 Shah Alam for their wonderful collaboration. Appreciation also goes to everyone involved directly or indirectly towards the compilation of this thesis.

ABSTRACT

This research was conducted to examine the effect of the 21st Century Acculturation Module on 21st Century Skills and academic achievement. The research sample comprised 120 form four students who took the Science subject from three secondary schools in Selangor and Perak. The experimental group consisted of students from Selangor, while the control group consisted of students from Perak. The quasi-experimental design was applied using quantitative data. Data collected were analysed using descriptive and inferential statistics, such as means, standard deviations, independent sample T-test and PLS-SEM. The result shows that for 21st Century Skills, namely Learning and Innovation (LI), the mean difference between control and experimental group was significant (t = -12.649, p = 0.000). As for the Life and Career (LC), the mean difference between control and experimental group was significant (t = -52.590, p = 0.000). In the case of Information, Media, and Technology (IMT) the mean difference between control and experimental group was significant (t = - 45.745, p = 0.000). Research finding also shows that there was a significant difference on students' academic achievement (AA) (t = -12.700, p = 0.000) between the experimental and control groups. The result gathered from PLS-SEM indicated that the moderating role of the developed module on the relationship between LC and AA was significant. The proposed module derived from that the amalgamation of Dale's Cone of Experiences and Revised Bloom's Taxonomy frameworks along with the technology usage in a virtual learning environment is evident to enhance 21st century skills of the students and they also performed better in the academic achievement.

ABSTRAK

Kajian ini dijalankan untuk mengenalpasti kesan Modul Pembudayaan Abad ke-21 ke atas kemahiran abad ke-21 dan pencapaian akademik. Sampel kajian terdiri daripada 120 pelajar tingkatan empat yang mengambil mata pelajaran Sains dari tiga sekolah menengah di Selangor dan Perak. Kumpulan eksperimen terdiri daripada pelajar dari Selangor, manakala kumpulan kawalan terdiri daripada pelajar dari Perak. Reka bentuk kuasi eksperimen telah digunakan menggunakan data kuantitatif. Data yang dikumpul dianalisis menggunakan statistik deskriptif dan inferensi, iaitu min, sisihan piawai, ujian-T sampel bebas dan PLS-SEM. Hasil kajian dalam kemahiran abad ke-21 pelajar iaitu *Learning and Innovation* (LI), perbezaan min antara kumpulan kawalan dan kumpulan eksperimen adalah signifikan (t = -12.649, p = 0.000). Manakala bagi *Life and Career* (LC), perbezaan min antara kumpulan kawalan dan kumpulan eksperimen adalah signifikan (t = - 52.590, p = 0.000). Bagi kes *Information, Media and Technology* (IMT), perbezaan min antara kumpulan kawalan dan kumpulan eksperimen adalah signifikan (t = - 45.745, p = 0.000). Hasil dapatan analisis menggunakan PLS-SEM menunjukkan bahawa penggunaan modul yang dibangunkan dapat mempengaruhi dengan memperkuatkan hubungan LC dengan AA. Modul yang dicaadangkan hasil dari penggabungan kerangka *Dale's Cone of Experience* dan *Bloom's Taxonomy* serta penggunaan teknologi dalam persekitaran pembelajaran maya dapat meningkatkan kemahiran abad ke-21 dalam kalangan pelajar dan mereka juga mencapai prestasi yang lebih baik dalam pencapaian akademik.

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LIST OF SYMBOLS AND ABBREVIATION

MOE	-	Ministry of Education
FF21A	-	Framework for 21st Century Skills Acculturation
AA	-	Academic Achievement
LI	-	Learning and Innovation
LC	-	Life and Career
IMT	-	Information, Media and Technology
VLE	-	Virtual Learning Environment
HOTS	-	Higher Order Thinking Skill

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The 21st century has brought significant changes to how the world operates especially in relation to the incorporation of technology into the teaching and learning process, which further enables various advanced methods that were not possible in the past. Prensky (2010) expressed that 66% of the general population on the planet in this era have a mobile phone; hence, this has led students to be engrossed in movies and computer games instead of focusing on school matters. In other words, this phenomenon has transformed the view of education among young generations because technology including music, movies, Internet, and others have diverted their attention from studying.

The methodology of teaching and learning paired with the advancement in innovation needs to be transformed in order to guarantee the creation of capable generation who are proficient and globally competent. The upheaval of innovation in this digital era has led to significant changes in the education world. In Malaysia, a virtual learning model called Frog Virtual Learning Environment (Frog VLE) was implemented in schools on 2012. The main function of Frog VLE is to support the "End to End" network that is used for teaching and learning purposes, including the administration and organisation of 10,000 schools for a total of 15 years. Frog VLE adopts an all-encompassing strategy towards innovation by concentrating on its utilization as a device for the overall improvement of the school as well as instilling the 21st Century Skills among students to enhance their success in education, life, and vocation (Ministry of Education, 2011). Schools will be outfitted with a coordinated arrangement that permits teaching, learning, collaboration, and administrative capacities to occur through the Internet-based Frog's Virtual Learning Environment

(Frog VLE), which can easily be acquired at school and from anyplace else with an Internet network. Apart from that, it offers excellent control that empowers educators, administrative staff, and even students to completely insert their learning platform into school's working practices by ensuring that it is in line with the necessities of their school (YTL Communications, 2011).

Unfortunately, there is a huge concern for teachers regarding the impacts of innovation utilization in teaching and learning process. Moreover, it is important to always remember that technology alone will not be able to make an important encounter in one's learning even though the use of technology has become the main approach in VLE and expected to trigger an apocalyptic impact on students.

According to Shen, Lee & Tsai (2007), teaching and learning process needs to be embedded together with both the learning strategies and learning theories. In addition, there is no doubt that there exist various options in technology utilisation, especially in the teaching and learning process. However, educators should wisely choose the appropriate one to be executed in the teaching and learning process considering the main purpose which is to support the desired learning objectives and learning outcomes. Meanwhile, higher order thinking skills (HOTS) or *Kemahiran Berfikir Aras Tinggi* (KBAT) is a salient skill that needs to be mastered in today's educational world. Most of the thinking skills applied in education prioritise HOTS, and at the same time, emphasise the 21st century skills among students (Ismail, Harun, Md Salleh & Megat Zakaria, 2016). This is in agreement with the target of Ministry of Education in Malaysia as stipulated in Malaysia Blueprint 2013-2025 which underlines the idea of HOTS through three fundamental categories, namely the composed educational modules, curriculum programs, and appraisal thinking educational programs.

However, research from Rajendran (2001) showed that educators in Malaysia were still practising a teacher-centred learning environment which was significantly different in relation to the teaching and learning process suggested in the HOTS teaching program. A possible explanation for this phenomenon may be the lack of HOTS skills among educators themselves. Besides, there is another crucial factors that affect the teaching and learning process which is training practices.

The training practices are formed based on different learning hypotheses regardless of whether it is known by the educators or not. In this case, it should be noted that this is on the grounds that learning hypotheses manage explicit thoughts of

sentiments, information, and skills by tending to the issue of how an individual learns (Petrina, 2007). Moreover, the concept of learning itself needs to be clearly defined by educators. A fundamental comprehension of learning techniques is considered as fundamental knowledge that needs to be grasped by individuals who plan to create activities that can possibly prompt for excellent learning to occur in a classroom (Pritchard, 2009). In any case, the issue is that instructors are commonly not well presented to a scope of learning hypotheses after some time (Petrina, 2007). Hence, educators should possess extensive knowledge in teaching strategies and learning theories for the purpose of improving the effectiveness of their teaching and learning process (Tan, 2010). Other than that, it is extremely crucial for educators to apply all of the information about learning theories in the development of their lesson plans to ensure that students will be able to obtain information effectively, thus making it possible to achieve the goals of the curriculum.

The learning environment in this century should be provided with an assortment of learning materials, dynamic commitment of materials, supportive discourse and trade between class individuals as well as sensually simulating (Bos, 1997). Regarding this matter, it is important to understand that Bloom's Taxonomy was developed to allow educators to discuss and exchange learning and assessment methods. The objective of learning from the taxonomy refers to the evaluation of various cognitive levels from lower to higher thinking skills. On a similar note, the aim of educators in using Bloom's Taxonomy is to help the, to enhance the cognitive level of students from lower to higher order thinking skills. The Revised Bloom's Taxonomy gives a tool to meet the needs of today's educators due to the prominent changes in the educational world. In addition, it should be noted that the framework of the Revised Taxonomy is able to provide "a clear, concise visual representation" (Krathwohl, 2002) of the arrangement between the standards and educational objectives, goals, items, and practices (Forehand, 2010). The term "pedagogy" itself suggests a prominent connection between theory and practice as well as learning and teaching. Hence, educators must acknowledge that pedagogy needs to be "redone" and "rethought" at the same time in order to adapt to changes that take place in this century. However, the enthusiasm in using new digital technologies among educators has caused them to overlook whether technologies are pedagogically effective or not (Beetham & Sharpe, 2013). Besides the concept of the Revised Bloom's Taxonomy,

there is another concept that should be taken into account in providing a holistic learning environment which is the Dale's Cone of Experience.

Dale's Cone of Experience is a famous framework for educators because it presents learning experiences on a continuum starting from very concrete, hands-on experiences to very abstract experiences like reading a book. More importantly, Dale (1946) also provides useful tools that can be used to discuss learning experience which is very beneficial for educators to design a meaningful learning experience for students. Nevertheless, numerous schools still find it difficult to apply the rationale of these understandings despite solid and systematic criteria developed by Dale (1946) known as Dale's Cone of Experience framework for the instruments which include media, strategies, and places that enable teaching activities to be held (Matijević, 2012). According to Subramony (2003), it is valuable to conduct frequent analyzation and investigation about the rationale offered by Edgar Dale in the Cone of Experience.

Besides Dale's Cone of Experience, another learning behaviour framework has been created to guide classroom interactions is Bloom's Taxonomy (Bloom, Englehard & Furst, 1956). Regarding this matter, Anderson & Krathwohl (2001) revisited and revised Bloom's Taxonomy in order to reflect (anticipated) 21st Century Skills of students. According to Schifter (2010), both of these frameworks are important in explaining how to ensure students are in engaged in their learning process at all six levels of difficulties (remember, understand, apply, analyse, evaluate, and create) and participation. In today's world, they still have the potential to help educators to better understand how 21st century students can be supported even though they have been around for 50 years (and Bloom Revised over 10 years). Moreover, it must be understood that this is not only meant for educational technologists but also for educators who are interested in promoting engagement in the classroom among students with different abilities.

The concern of the present study is to investigate the relation between two theoretical frameworks, namely Dale's Cone of Experience and Bloom's Taxonomy. Apart from that, it is important to know how they can be adapted in this 21st century learning and its capabilities to support 21st century learners, technology training, and 21st century skills acculturation. Therefore, the main aim of this research is to determine whether these frameworks are still relevant to be used in this century.

1.2 Background of the study

The significant changes in data and communication technologies majorly affect different areas around the globe. Meanwhile, the educational world appears to have problems in adjusting with the advanced age, particularly in creating graduates who are excellent in their studies as well as their life, career, and work. This is on the grounds that learning in the 21st century is distinctively unique from the past. The rapid changes in ICT (Information, Communication, and Technology) have transformed the educational world from customary teaching strategies to innovation-based teaching and learning techniques. In Malaysia, ICT has been incorporated as one of the fundamental components in the Malaysian Education Blueprint (2013-2025) because of the national education centers around quality education for future improvement. A possible explanation for this is because the integration of ICT in teaching and learning process bolsters the learning execution of students as far as critical thinking, problem-solving, and practising by surfing for online information (Simin & Sani, 2015).

Educators today are aware that advanced innovation is turning into a significant piece of students' education (Glancy & Isenberg, 2011; Gill & Dalgarno, 2008). The present instructors are setting up their students not just for the life following their graduation including their working lifetimes; hence, innovation becomes an important aspect that needs to be adopted by students (Prensky, 2010). According to Chan (2002), Malaysia's Vision 2020 which calls for continued and profitability driven development must be feasible with an innovatively proficient and critically thinking workforce arranged to take complete interest in the worldwide economy of the 21st century. Consequently, teaching and learning process needs to be enhanced alongside the quick improvement of data and communication technology.

In this digital age, the traditional method for teaching and learning process has now been viewed as unsuited to the present practice (Marold, Larsen & Moreno, 2000). Moreover, the attributes and properties of the teaching world in satisfying the workforce demand change along with the continuous advancements and new development of advances. The expression "21st Century Skills" has turned into the watchword in the education world which encourages the educators to put more emphasis on the usage of the 21st Century Skills alongside the utilisation of innovation in teaching and learning process. Furthermore, it should be noted that 21st Century

Skills comprised of three domains of skills, namely learning and development abilities; data, media and innovation skills; and life and profession skills (Partnership for 21st Century Skills (P21), 2007). Hence, the education world has turned out to be more complicated each day (Partnership for 21st Century Skills (P21), 2007; Pandian, 2005; Dakich, 2005; Kementerian Pelajaran Malaysia (KPM), 2010). Meanwhile, the use of the 21st Century Skills needs to be enhanced alongside the present innovation on the grounds that the two components are significant perspectives in the present digital time. According to Ghavifekr, Kunjappan, Ramasamy & Anthony (2016), technology usage in the classroom is important for giving students the opportunities to enhance and gain knowledge on the 21st Century Skills. A clear explanation for this is that the utilisation of innovation is able to empower students to obtain information on the 21st Century Skills; for example, unravelling complex assignments, make quick decisions, and critical thinking which are the abilities required in the 21st century (Prensky, 2006; Sanders & Morrison-Shetlar, 2000; Jones & Fitzgibbon, 2006). Turiman, Omar, Daud & Osman (2012) stated that fostering the 21st Century Skills in science and technology sector among students are the vital aspect that can overcome the challenges and ensure students' competitiveness in the globalisation era. Therefore, an appropriate strategy for learning methodology to satisfy this current century's prerequisites should be framed carefully for future education with the realisation of the progressions brought about by this advanced time.

In any case, to the effective method to set up the best learning system to meet this 21st century's prerequisite is yet to be discovered. A more profound comprehension of the learning condition in this century should be aced by the individuals who are intrigued to conduct further investigation in this field. Hence, an in-depth exposure should be taken into consideration in order to guarantee the adequacy of utilising innovation in teaching and learning process. Moreover, it should be noted that various projects are technology-based which have been implemented in schools such as Smart Schools, Computer in Education, Computer Literacy, SchoolNet, and the latest one known as 1BestariNet. The present study has taken an initiative to conduct a preliminary study about the unclear issues in the schools involved in the 1BestariNet project due to the concern over the success of 1BestariNet Project which introduced Frog VLE usage in the education sector. Surprisingly, the present study found that through the courses offered to educators, educators are only exposed about the method of utilising the Frog program instead of the technique of

using it in teaching and learning process so as to accomplish targeted learning results. According to Auditor-General Report (2014), the usage of the Frog VLE platform by educators at Malaysian secondary schools were at low level. The report also stated that educators are not ready to access Frog VLE cause by the massive workload. Jani, Muszali, Nathan & Abdullah (2018) claimed that none of the educators have prepared teaching materials on line using Frog VLE platform in their teaching and learning approach.

According to Ismail *et al.* (2016), technology needs to be applied with the appropriate pedagogy in generating HOTS among students on the ground that technology alone is unable to lead students to achieve HOTS. Apart from that, the current research believes that educators have the knowledge about technology usage in teaching and learning processes as well as the importance of embedding technology with learning strategy, learning theories, and learning environment. However, the inconsistency between technology usage and the main purpose of its use in teaching and learning process will trigger a great impact on students' learning outcomes. Rajendran (2001) claims that hands-on courses on teaching HOTS with a sufficient time period are necessary to ensure educators are well prepared. Meanwhile, the skills in teaching HOTS and the use of technology should also be exposed and practised by educators. A possible explanation for this is that the commitment of learning condition, which is enhanced by innovation utilisation, the employment of learning strategies, and the association with the human mind in the learning procedure are the fundamental angles that should be considered in planning a proper learning system.

The effective technique to utilise technology in school is still unclear, and most educators are still figuring out how to use technology meaningfully in their teaching practice. Early studies indicated that there are assortments of outside barriers that kept educators from utilising technology in manners that are closely related with their beliefs (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurud & Sendurur, 2012). The options for using technology are vast, but educators and school leaders must ensure that the options support the goals of the curriculum (Schifter, 2010). The success of technology used in web-based learning relies upon the learning systems (Hill, 2002) along with the students' level of inspiration (Shapley, 2000). Educators have the privilege to be concerned in light of the fact that innovation can either help or frustrate the educational procedure depending on how it is utilised, (Prensky, 2010).

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